CLAIMS

1. A linear motor comprising a first magnetic field detector and a second magnetic field detector mutually separated by a nominal predetermined distance that is subject to manufacturing/assembly tolerances that can introduce an error, said error causing said first and second magnetic field detectors to be in reality mutually separated by an actual distance that can be different to said nominal predetermined distance;

wherein there exists an ideal working distance by which said first and second magnetic field detectors should be mutually separated in order to obtain ideal signals; and

wherein said nominal predetermined distance is different to said ideal working distance.

2. A linear motor according to claim 1, wherein said nominal predetermined distance is greater than said ideal working distance.

3. A linear motor according to claim 1 or 2, wherein said nominal predetermined distance is greater than said ideal working distance by an amount such that said actual distance will, for the known tolerances, be greater than said ideal working distance.

4. A linear motor according to any one of claims 1 to 3, wherein said nominal predetermined distance is a distance corresponding to about 95° of phase shift between said first and second magnetic field detectors.

5. A linear motor according to claim 1, wherein said nominal predetermined distance is smaller than said ideal working distance by an amount such that said actual distance will, for the known tolerances, be smaller than said ideal working distance.

6. A linear motor according to any one of claims 1 to 5, wherein said ideal working distance is a distance corresponding to 90° of phase shift between said first and second magnetic field detectors, which distance will be one quarter of the full cyclical pole pitch of the magnets of the rotor of the linear motor.

7. A linear motor according to any one of claims 1 to 6, further comprising correction means arranged to synthesise a correction signal for correcting the output signal of said first magnetic field detector so that the signals obtained after correction more closely correspond to the signals that would have been obtained had said first and second magnetic field detectors been correctly mutually separated by the ideal working distance.

8. A linear motor according to claim 7, wherein said correction means is incorporated into the structure of the linear motor so that the output signals presented to the user are already corrected.

9. A linear motor according to claim 7 or 8, wherein said correction means is arranged to add said correction signal to said output signal of said first magnetic field detector so as to obtain a corrected first magnetic field detector signal.

10. A linear motor according to any one of claims 7, 8 or 9, wherein said correction signal comprises a scaled version of the output signal of said second magnetic field detector.

11. A linear motor according to claim 10, wherein said correction means is arranged to scale the output of said second magnetic field detector by an amount dependent on the actual distance separating said at least two magnetic field detectors.

12. A linear motor according to claim 10 or 11, wherein the scaling amount is determined by a resistor in a summing circuit of said correction means.

13. A linear motor according to claim 12, wherein said resistor is an adjustable potentiometer.

14. A linear motor according to claim 13, wherein said adjustable potentiometer is digitally controllable by a calibration computer.

15. A linear motor according to any one of claims 7, 8 or 9, wherein said correction signal comprises a scaled and phase shifted version of the output signal of said first magnetic field detector.

16. A linear motor according to claim 15, wherein said correction signal is a scaled version of said output signal of said first magnetic field detector phase shifted by 90°.

17. A linear motor according to any one of claims 7, 8 or 9, wherein said correction signal is synthesised digitally.

18. A method of making a linear motor, said method comprising:

(a) determining an ideal working distance by which first and second magnetic field detectors should be mutually separated in order to obtain ideal signals;

(b) selecting a nominal predetermined distance different to said ideal working distance; and

(c) assembling first and second magnetic field detectors on a stator member so as to be said nominal predetermined distance apart.

19. A method according to claim 18, wherein said nominal predetermined distance is selected to be greater than said ideal working distance.

20. A method according to claim 19, wherein said nominal predetermined

distance is greater than said ideal working distance by an amount such that said actual distance will, for the known tolerances, be greater than said ideal working distance.

21. A method according to any one of claims 18 to 20, wherein said ideal working distance is a distance corresponding to 90° of phase shift between said first and second magnetic field detectors, which distance will be one quarter of the full cyclical pole pitch of the magnets of the rotor of the linear motor.

22. A method according to any one of claims 18 to 21, wherein said nominal predetermined distance is a distance corresponding to about 95° of phase shift between said first and second magnetic field detectors.

23. A linear motor comprising a first magnetic field detector and a second magnetic field detector mutually separated by a nominal predetermined distance that is subject to manufacturing/assembly tolerances that can introduce an error, said error causing said first and second magnetic field detectors to be in reality mutually separated by an actual distance that can be different to said nominal predetermined distance;

wherein there exists an ideal working distance by which said first and second magnetic field detectors should be mutually separated in order to obtain ideal signals; and

further comprising correction means arranged to synthesise a correction signal for correcting the output signal of said first magnetic field detector so that the signals obtained after correction more closely correspond to the signals that would have been obtained had said first and second magnetic field detectors been correctly mutually separated by the ideal working distance.

24. A method of making a linear motor, said method comprising:

(a) assembling first and second magnetic field detectors on a

stator member so as to be a nominal predetermined distance apart;

(b) analysing the signals from said magnetic field detectors so as to determine a correction signal; and

(c) adjusting correction means to provide that, in use, said correction signal is synthesised and used to correct the output of said first magnetic field detector so that the signals after correction more closely correspond to ideal signals.

25. A method according to claim 24, wherein step (b) includes determining a scaling amount to be used in scaling an output of said second magnetic field detector, said scaled output being for use as said correction signal.

26. A method according to claims 24 or 25, wherein step (b) includes

(i) determining a rotor position for which the signal from said second magnetic field detector is substantially zero; then

(ii) moving the rotor relative to the stator by an amount substantially equal to one quarter of the full cyclical pole pitch of the magnets of the rotor, and

(iii) measuring the signal from said first magnetic field detector.

27. A method according to claim 26 when dependent on claim 25, wherein said scaling amount is determined in accordance with the signal from the first magnetic field detector measured in step (iii).

28. A method according to any one of claims 24 to 27, wherein said correction means is digitally adjusted by a computer connected to said linear motor.

29. A method according to any one of claims 24 to 28, wherein said correction means is adjusted until it is determined that said signals are substantially ideal.

30. A method according to any one of claims 24 to 29, wherein signals from said first and second magnetic field detectors that are 90° out of phase are considered to be ideal signals.

31. A method according to any one of claims 24 to 30, wherein said correction means is incorporated into the structure of the linear motor.

32. A method according to any one of claims 24 to 31, wherein said nominal predetermined distance is selected to be different to an ideal working distance defined as the mutual separation of the first and second magnetic field detectors that gives ideal signals.

33. A method of operating a linear motor, said method comprising:

(a) providing drive currents to the coils of a stator of said linear motor;

(b) receiving signals from first and second magnetic field detectors;

(c) synthesising a correction signal for correcting the output of said first magnetic field detector;

(d) correcting the output of said first magnetic field detector using said correction signal;

(e) using the corrected first magnetic field detector output and the second magnetic field detector output to determine the position of the rotor with respect to the stator.

34. A method according to claim 33, wherein said correction signal is added to the output of said first magnetic field detector in step (d).

35. A method according to claim 33 or 34, wherein said correction signal is synthesised in step (c) by scaling the output signal of said second magnetic field

detector.

36. A method according to claim 35, wherein the scaling amount is determined by a resistor in a correction circuit of said linear motor.

37. A method according to any one of claims 33 to 36, wherein said first and second magnetic field detectors are longitudinally separated on the stator of said linear motor by nominal predetermined distance different to an ideal working distance defined as the mutual separation of the first and second magnetic field detectors that gives ideal signals.

38. A method according to claim 37, wherein said ideal working distance is a distance corresponding to 90° of phase shift between said first and second magnetic field detectors.